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ABSTRACT

This junior high teaching unit on science and careers is one in a series of career guidebooks developed by Project CHOICE (Children Have Options in Career Education) to provide the classroom teacher with a source of career-related activities linking classroom experiences with the world of work. The unit follows a typical format that includes the rationale, goals, performance objectives, instructional strategy, evaluation, and suggested instructional materials (including books, films, and filmstrips). The remainder of the unit is comprised of instructional activities designed to introduce students to some aspects of scientific fields as they are related to career choice. (The unit is one of two in the series on science and engineering occupations. For these and junior high units in other career clusters, see CE 025 738-765.) (LRA)

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FOREWORD

Project CHOICE: Children Have Options in Career Education, is an Exemplary Project from the San Diego City School District, which has been adapted, with ESEA Title IV-C funding, for Kern County Schools.

Through Project CHOICE, units have been developed to provide the classroom teacher with a source of career-related activities linking classroom experiences with the world of work. All students, regardless of their post-high school plans, share an equal need for career awareness, decision making skills, and other elements of career education. This goal can be accomplished if all teachers and counselors "fit" the appropriate units where they best apply in the curriculum.

We are indebted to the San Diego City School District, and the Project CHOICE staff, for developing and field testing the original units.

For their excellent work in re-writing the units in order to adapt them for use in Kern County Schools, we wish to recognize:

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A CAREER EDUCATION UNIT FOR JUNIOR HIGH SCHOOL

SCIENCE AND CAREERS

Science and Engineering Occupations Career Cluster

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Science and Engineering Career Cluster

SCIENCE AND CAREERS

RATIONALE

The impact of the sciences on society is greater now than ever in the past and new developments are bringing an ever increasing variety of careers at all levels of education in science. This unit is designed to introduce students to some aspects of scientific fields as they are related to career choice.

GOALS

Through this unit, students will:

- -Become aware of the wide range of science-related careers which are available at various educational levels.
- -Research at least one science-related career in depth.
- -Relate their interests to science careers.
- -Utilize decision-making skills to plan for a science career.
- -Correlate salary potential to careers in science.
- -Explore skills used in science careers.

PERFORMANCE OBJECTIVES

By the end of this unit, students will be able to:

- -List at least ten jobs requiring a background in science.
- -Define interests which relate to careers in science.
- -Name at least four factors to be taken into consideration when planning for a career.
- -Discuss the interdependence of work roles in the community.
- -List at least three skills and tools used by people in science-related careers.
- -Name at least three day-to-day activities that require some level of science knowledge.
- -Discuss at least one science-related career in depth.

INSTRUCTIONAL STRATEGY

This curriculum unit has been designed for use by a class, small group, or individual student. So that the materials can be easily duplicated for individualized instruction, all learning activities are written for the student. Activities designated ALL are intended to provide factual information, those designated YOUR CHOICE have been included to provide experiential activities which draw upon this background. This technique also provides an opportunity to put decision-making skills into action in the classroom, a process important to career development.

EVALUATION

It is important to evaluate the effectiveness of this unit in terms of the learning that takes place as well as reactions of the learner. A sample inventory has been provided, which can serve to both introduce the unit and assess its effectiveness, or the teacher may wish to develop his/her own.

SUGGESTED INSTRUCTIONAL MATERIALS

Use resources of the library or a Career Center in this unit--VIEW materials, Occupational Outlook Handbooks, career briefs, etc.

Film: Technicians in Our Changing World

AVAILABLE IN INSTRUCTIONAL RESOURCES CENTER: OFFICE OF THE KERN COUNTY SUPERINTENDENT OF SCHOOLS
(Please preview first, to be certain of suitability for specific students and situations).

Films: MP 1192 Why Study Science? (7-12)
MP 5481 What Zoologists Do (4-12)

COMMUNITY RESOURCES

Field Trips:

Bakersfield College Planetarium; 1801 Panorama Drive; Bakersfield.

Cal State Science Building; 9001 Stockdale Highway; Bakersfield.

NASA Flight Research Center; Edwards Airbase.

The Naval Ordinance Test Station at China Lake.

Science and Engineering Career Cluster

SCIENCE AND CAREERS

INSTRUCTIONAL ACTIVITIES

ALL:

1. PRETEST

Take the written Pretest to find out how much you already know about SCIENCE AND CAREERS. After the unit, take it again to determine how much you've learned.

2. CHOOSING CAREERS

A career related to science offers exciting opportunities for workers at many educational levels. Scientific jobs involve, first of all, working with data (facts), although many of these jobs also include contact with people or things. Consider these high school students, their interests and abilities.

- MARIA is in her last year of high school. She has most enjoyed her classes in art, biology and chemistry, and has done volunteer work at a local hospital. Friends say that she draws and does craft work well; she scored high on a test of manual dexterity (ability to work with her hands). Maria would like to go to a junior college or technical school and find a career in the health sciences field (but not in nursing). Is there a career in science for her?

- ELLEN is planning to go to college, and would consider a career that requires even more training. She is very much concerned about our environment, and prefers to work outdoors; she enjoys swimming and backpacking. Ellen has done well in school, and has taken four years of mathematics and such science courses as Marine Science and Environmental Studies. Are there careers using science that Ellen should consider?

- JIM is thinking about going into the armed forces after high school graduation. He has always been interested in making machines work, and has enjoyed his courses in auto mechanics and general science. His mother sometimes complains that all his friends bring their cars to his house so he can fix them. Is there a career in science that Jim can train for in the armed forces?

- TOM wants to select a career through which he will be helping people, but he also enjoys working with science. He does well in social studies and science courses, but is not especially good at working with his hands. People enjoy talking with Tom; he speaks well and is helpful to others. Tom has taken all of the biology, chemistry and human behavior courses that are available in his high school and has an excellent high school record. He plans to attend the University of California. Are there careers in science for Tom?

- CAROL loves animals and they seem to respond well to her. She has always dreamed about being a veterinarian but does not think she wants to spend all of those years going to school. Carol has enjoyed courses in general science, biology, and a work experience course in small animal care. She thinks she wants to get a job as soon as she finishes high school, and make a decision about more education while she is working. Are there careers related to science for Carol?

Use the list of "Scientific Careers" to choose three careers that fit the interest, ability and education needs of each of these students. Compare your choices with others in a class discussion, and tell why you feel each career fits the person to which you assigned it.

OR

Role-play a counselor-student interview for each student described above. One student will take the part of each one of these students; another should act as counselor to help clarify potential careers and suggest further explorations. (You may wish to add descriptions of other student situations--your own, for instance!)

3. Choose one of these students described above and one career that you would like to find out more about for him/her OR choose another career related to science that interests YOU. Use materials in your library or Career Center to complete the "Science Occupation Information Worksheet." Identify other members in your class who have explored closely related careers, meet with them to share information, then plan a group presentation to the class. You might consider grouping your reports as Health Science Careers, Environmental Science Careers, Mechanical Science Careers, plus other groups that you can think of.

SCIENTIFIC CAREERS

HIGH SCHOOL GRADUATE & ON-THE-JOB TRAINING	TECHNICAL OR JUNIOR COLLEGE (1-3 YRS. AFTER HIGH SCHOOL)	COLLEGE GRADUATE OR ABOVE (4 OR MORE YEARS AFTER HIGH SCHOOL)
Air-Conditioning, Heating & Refrigeration Mechanic	Acoustician	Aerospace Engineer
Animal Caretaker	Agricultural Technician	Agricultural Inspector
Animal Trainer	Aircraft Mechanic	Agricultural Biologist
Appliance Servicemen	Airplane Pilot	Agronomist
Bricklayer	Automobile Mechanic	Airplane Pilot
Cosmetic Mixer	Biological Research Aide	Anatomist
Darkroom Worker	Blood Bank Technician	Anthropologist
Dental Lab Technician	Botanical Artist	Applied Science Programmer
Dog Groomer	Broadcast Technician	Aquatic Biologist
Draftsman	Cosmetic Foreman	Architect
Dry Cleaner	Cosmetologist	Astronomer
EEG Technician	Dental Assistant	Athlete, Professional
Farm Laborer	Dental Hygienist	Atomic Scientist
Florist	Dental Lab Technician	Audiologist
Food Tester	Diesel Mechanic	Biochemist
Gamekeeper	Dispensing Optician	Biologist
Heavy Equipment Operator	Diver	Biophysicist
Home Health Aide	Draftsman	Botanist
Inhalation Therapist	Electrician	Ceramic Engineer
Kennelman	Electronics Mechanic	Chemical Engineer
Landscape Gardener	Embalmer	Chemist
Lens Grinder	Engineering & Science Technician	Chiropractor
Lumber Inspector	Environmental Aide	Civil Engineer
Marine Craftsman	Farmer	Climatologist
Masseur	Fingerprint Technician	Counselor
	Fish Hatchery Foreman	Criminologist
	Fireman	Curator
	Fisheries Technician	Demographer
	Flight Engineer	Dentist
	Food Processing Technician	Dietician
	Forestry Aide	Ecologist
	Glassblower	Electrical Engineer
	Hearing Tester	Entomologist
	Inhalation Therapist	Environmental Designer
	Lab Assistant	Environmental Health Specialist
	Medical Illustrator	Explorer
	Medical Lab Technician	Farm Advisor
	Medical Secretary	F.B.I. Agent
	Merchant Seaman	Flight Surgeon
	Mortician	Food & Drug Inspector
	Navigator	Food Scientist
	Nuclear Technician	Forester
	Nurse (LVN)	Gemologist
	Nursery Man	Geneticist
	Occupational Therapy Assistant	Geographer
	Oceanographic Aide	Geologist
	Optical Mechanic	Geophysicist
	Pharmaceutical Salesman	Health Inspector
		Health Physicist

SCIENTIFIC CAREERS

HIGH SCHOOL GRADUATE & ON-THE-JOB TRAINING	TECHNICAL OR JUNIOR COLLEGE (1-3 YRS. AFTER HIGH SCHOOL)	COLLEGE GRADUATE OR ABOVE (4 OR MORE YRS. AFTER HIGH SCHOOL)
Meat Cutter	Photographer	Home Economist
Medical Assistant	Photographic Technician	Horticulturalist
Museum Worker	Plumber	Hospital Administrator
Nursery Employee	Policeman	Husbandry Man
Nurse's Aide	Purchasing Agent	Landscape Architect
Optometrist Assistant	Radio & TV Service Technician	Lawyer
Pest Control Worker	Radiologic Technologist	Market Specialist
Physical Therapy Assistant	Recreation Aide	Mathematician
Poultryman	Salesman, Scientific Supplies & Equipment	Medical Lab Worker
Psychiatric Aide	Science Secretary	Medical Record Librarian
Scientific Helper	Scientific Technical Writer	Medical Technologist
Stonemason	Screen Processing Worker	Meteorologist
Stableman	Soil & Water Technician	Microbiologist
Surgical Technician	Sound Effects Man	Music Therapist
Telephone Lineman	Speciman Collector	News Reporter
Teletype Operator	Surgical Assistant	Nurse
Veterinary Hospital Attendant	Surveyor	Nutritionist
Zoo Caretaker	Taxidermist	Occupational Therapist
	Veterinary Aide	Oceanographer
	Water Supply & Pollution Technician	Optometrist
	Weather Clerk	Park Ranger
	Weather Observer	Patent Examiner
	Wildlife Conservation Aide	Pathologist
	X-Ray Technician	Pharmacist
		P.E. Teacher
		Physical Scientist
		Physical Therapist
		Physician
		Physicist
		Physiologist
		Podiatrist
		Psychologist
		Radiologic Technician
		Range Manager
		Recreation Specialist
		Rehabilitation Therapist
		Resource Conservationist
		Sales Engineer
		Salesman
		Sanitarian
		Science Editor
		Scientific Researcher
		Science Teacher
		Science Writer
		Seismologist
		Soil Conservationist
		Soil Pathologist
		Statistician
		Surgeon
		Translator
		Tree Surgeon
		Veterinarian
		Weather Chart Preparer
		Wildlife Specialist
		Zoologist

OCCUPATION INFORMATION WORKSHEET

1. Name of occupation _____.

2. List as many jobs related to this occupation as you can.

   a. _____ b. _____

   c. _____ d. _____

3. Investigate the occupation with respect to the following facts:

   a. Nature of the work (What daily tasks are actually performed?)

   _____

   _____

   _____

   b. Interests and aptitudes required (What things should you be able to do well? What things should you like to do?) _____

   _____

   _____

   c. Education required (What subjects will you need to study? Is high school graduation required? A college degree? Technical training?)

   _____

   _____

   _____

   d. Other requirements (Work experience, union membership, special examinations, licenses, etc.) _____

   _____

   _____

   e. Work conditions (Is the work inside or outside, clean or dirty, heavy or light, etc.? Are there special mental strains? What are the hours? Are there health or safety hazards?)

   _____

   _____

   _____

   _____

f. Job locations and employment trends (What is the demand for workers? Is the demand increasing or decreasing? Where would the best job opportunities be? How many workers are employed in this occupation nationally and locally?)

g. Wages and opportunities for advancement (What is the starting wage? The top wage? What are chances for promotion? Is extensive educational updating necessary? Are there benefits or compensation for illness, accidents, unemployment, old age?)

h. Social importance (In what way is this job useful to society? Would a person gain satisfaction from engaging in this career?)

i. Personal advantages (What do you like about this job?)

j. Personal disadvantages (What do you dislike about this job?)

YOUR CHOICE:

4. RESEARCHING YOURSELF...

Working in science, at any level, involves a particular way of problem solving learning which is sometimes referred to as scientific method. Scientific method experimentation involves asking a question, gathering data through research finding all kinds of facts that pertain to the question, and researching conclusions about that question.

Practice gathering data:

a. Find a place away from everyone else--a corner of the classroom, hall, or a place outside, a place where no one will bother you. Take a pencil and piece of paper and a watch with a second hand, if possible. Every thirty seconds, write down some input from your senses--something you see, hear, smell, taste, or feel. Continue this data-gathering for ten minutes (twenty entries). Count how many entries you made for each of your senses. Which sense did you pay most attention to? Least attention? Share your experiences in a small group or class discussion.

OR

b. How much do you depend on one sense? Plan to participate, with a small group of other students, in a blindfold experiment. Bring several objects from home, so that you have a total of about twenty. Each student takes a turn to be blindfolded and examine the objects. One person acts as recorder of data and notes which objects are correctly identified, and which are not correctly identified. After all participants have finished, total your data. Which objects were most difficult for a blindfolded subject to identify? Why?

5. SCIENCE EVERY DAY

Our society has become highly developed technologically, which is to say that we are dependent on the products of science. Many of the everyday activities in our lives depend to some degree on science knowledge.

Keep a log for three days: list the activities in which you and your family participate which require science knowledge, and describe the kind of knowledge involved. For example:

Bake a cake . . . . . .Chemistry: action of soda and acid
Care of house plants. . . . . .Biology: plants need for light and water
Start car with jumper cables. .Electricity: positive and negative charges

It is said that there are more scientists alive today than all those who lived before the history of the world. Look at your list of science activities. How many would not have been possible ten years ago? Twenty-five years ago? Fifty years ago? (You may need some help from your parents or teacher with this.) Share your list in a small-group or class discussion.

SCIENCE AND CAREERS

Pretest and Post Test

List ten jobs that require a background in science, and supply the educational level necessary for each one.

	Job	Training Required
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		

A person in a science related career would have the following interests:

11.
12.
13.

List three skills or abilities used by people in science careers:

14.
15.
16.

Three day-to-day activities that require some level of science knowledge are:

17.
18.
19.